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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/799,652	03/15/2004	Jin-sung Lee	2557SI-001272/US	8579

30593 7590 08/01/2011

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EXAMINER	
RAHIM, AZIM	

ART UNIT	PAPER NUMBER
3784	

MAIL DATE	DELIVERY MODE
08/01/2011	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/799,652	LEE ET AL.	
	Examiner	Art Unit	
	AZIM RAHIM	3784	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *09 May 2011*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-7,10-16,18 and 21-27* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-7,10-16,18 and 21-27* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *15 March 2004* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

3. Claims 1, 3-5, 7 and 26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hisai et al. (US 2003/0192686) in view of Hoang (US 2003/0159808).

Regarding claim 1, Hisai et al. discloses a baking system (fig. 3) having a holding unit (11) adopting a heat pipe (interior of holding table 11; see paragraph 54, lines 1-6) including a plate for receiving a wafer to be baked (holding table mounting face 11a, see paragraph 54, lines 7-13); wherein the heat pipe is capable of providing vaporization of coolant therein (see paragraph 56, lines 6-12), a heater for heating the plate (heater 17 heating a working fluid to expand throughout holding table 11, [0056]), and a cooling apparatus for cooling the plate [see

paragraph 57]; a thermostatic element (CPU 31 in combination with cooling pipe 21) maintaining an approximately constant temperature of the coolant supplied into the heat pipe when the plate is cooled [see paragraphs 62 & 71: when the set temperature is achieved, the refrigerant is maintained at a constant temperature in order to maintain the set temperature]. It is noted that cooling pipe 21 can be considered as a thermostatic element since it affects the temperature within the heat pipe as shown in figure 3.

Hisai et al. fail to disclose that the heat pipe is arranged in proximity and external to the plate with the heater disposed therebetween, the heat pipe and the plate being discrete elements and the heater being disposed between the heat pipe and the plate; and a coolant storage tank for supplying the coolant to the cooling element when the plate is cooled and for receiving the coolant when the plate is heated, wherein the coolant is supplied to the heat pipe via a path and the coolant storage tank receives the coolant supplied to the heat pipe via the path used in supplying the coolant into the heat pipe, the path being between the coolant storage tank and the heat pipe.

Hoang teaches a loop heat pipe apparatus (referring to figure 1) that includes an evaporator heat pipe (100), a reservoir (110), a coolant supply line (the whole of vapor/liquid loop as illustrated in figure 1) disposed between the evaporator heat pipe and the reservoir (as illustrated in figure 1, the coolant supply line has a portion that provides flow of fluid from the reservoir to the heat pipe, and from the heat pipe to the reservoir, thus both portions being disposed between the heat pipe and the reservoir and in combination supporting the supply of fluid from the reservoir to the heat pipe), wherein a vaporizable coolant is supplied to the evaporator heat pipe from the reservoir and returned to the reservoir while a device that outputs

heat positioned near the heat pipe is heated and cooled (see paragraphs 22 and 24). It is noted that the device can be heated and cooled simultaneously since heat is inputted while the fluid flows through the device.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the system of Hisai et al. to include the heat pipe, reservoir, coolant supply line, and the function of a coolant being sent to and from a reservoir tank while a device is being cooled as taught by Hoang in order to maintain the wafer at a constant temperature, thus preventing deformation in the circuitry of the wafer and to prevent wasting of fluid.

Although Hisai et al. are deficient in disposing the heater between the heat pipe and a plate separate from the heat pipe, at the time the invention was made, it would have been an obvious matter of design choice to a person having ordinary skill in the art to dispose the heater between the heat pipe and a plate separate from the heat pipe, because the Applicant has not disclosed that disposing the heater between the heat pipe and a plate separate from the heat pipe provides a particular advantage, is used for a particular purpose, or solves a stated problem. One having ordinary skill in the art, furthermore, would have expected Hisai et al.'s structure, and Applicant's invention to perform equally well with either the structure as taught by Hisai et al. and the heater being disposed between the heat pipe and a plate separate from the heat pipe because both wick configurations would perform the same function of cooling a wafer via vaporization of a coolant.

Therefore, it would have been a prima facie case of obviousness to modify Hisai et al. to obtain the invention as specified in claim 1 because such a modification would have been

considered a mere design choice which fails to patentably distinguish over the prior art of Hisai et al.

Regarding claims 3 and 4, Hisai et al. teach the limitation of providing a cooling water tank (25) for circulating cooling water through the heat pipe [see paragraph 58]; and a cooling water supply line (22), which is a path of cooling water, that extends into the heat pipe and provides flow communication between the heat pipe and the cooling water storage tank [illustrated in figure 3 and see paragraph 58], and providing a valve (26) between the cooling water storage tank and the heat pipe [illustrated in figure 3].

Regarding claims 5 and 26, please see the rejection of claim 1 pertaining to the Hoang reference.

Regarding claim 7, Hisai et al. disclose the limitation of the heat pipe having a ceiling portion and internal side portions (illustrated in figure 3).

4. Claims 6, 12-16, 18 and 21-24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hisai et al. as modified by Hoang as applied to claims 1, 5 and 7 above, and further in view of Hara et al. (US 5,413,167).

Regarding claim 6, Hisai et al. as modified by Hoang teach all the limitations of the claimed invention, but fail to teach that the coolant supply pipeline has a valve disposed between the coolant storage tank and the heat pipe.

Hara et al. disclose the limitation of providing a valve (98) between a coolant storage tank (97) and a heat pipe (91) (illustrated in figure 9).

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the system of Hisai et al. as modified by Hoang to include the valve as taught by Hara et al. in order to control the amount of coolant entering the heat pipe, thus preventing overcooling of the heat pipe.

Regarding claims 12 and 24, Hisai et al. as modified by Hoang teach all the limitations of the claimed invention, but fail to teach a wick disposed on the ceiling portion and internal side portions of the heat pipe. Hara et al. disclose the limitation of providing a wick (38) on the ceiling portion and on the internal side portions of the heat pipe (illustrated in figure 4).

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the heat pipe of Hisai et al. as modified by Hoang to include a wick disposed on the interior portions of the heat pipe as taught by Hara et al. in order for fluid to reach the entire interior surface of the heat pipe, thus increasing cooling efficiency.

Regarding claim 13, Hara et al. further teach the limitation of the wick on the ceiling portion and the wick on the internal side portions of the heat pipe has a linear shape [as illustrated in figure 4, wick 38 is linear in shape].

Regarding claim 14, Hisai et al. as modified by Hoang and Hara et al. teach all the limitations of the claimed invention, but fail to teach the limitation of the wick on the ceiling portion having a different shape than the wick on the internal side portions of the heat pipe.

Although Hara et al. are deficient in providing the wick on the ceiling portion having a different shape than the wick on the internal side portions of the heat pipe, at the time the invention was made, it would have been an obvious matter of design choice to a person having ordinary skill in the art to provide a wick on the ceiling portion having a different shape than the wick on the internal side portions of the heat pipe, because the Applicant has not disclosed that providing a wick on the ceiling portion having a different shape than the wick on the internal side portions of the heat pipe provides a particular advantage, is used for a particular purpose, or solves a stated problem. One having ordinary skill in the art, furthermore, would have expected Hara et al.'s system, and Applicant's invention to perform equally well with either the wicks as taught by Hara et al. and the claimed wick on the ceiling portion having a different shape than the wick on the internal side portions of the heat pipe because both wick configurations would perform the same function of transporting fluid via capillary action.

Therefore, it would have been a prima facie case of obviousness to modify Hara et al. to obtain the invention as specified in claim 14 because such a modification would have been considered a mere design choice which fails to patentably distinguish over the prior art of Hara et al.

Regarding claim 15, Hisai et al. as modified by Hara et al. teach all the limitations of the claimed invention, but fail to teach a wick formed on the internal side portions of the heat pipe, and the limitation of the wick plate on the ceiling portion having a plurality of planar wicks.

Hara et al. disclose the limitation of providing a wick (38) on the ceiling portion and on the internal side portions of the heat pipe (illustrated in figure 4).

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the heat pipe of Hisai et al. as modified by Hoang to include a wick disposed on the interior portions of the heat pipe as taught by Hara et al. in order for fluid to reach the entire interior surface of the heat pipe, thus increasing cooling efficiency.

Although Hara et al. are deficient in providing a wick plate on the ceiling portion having a plurality of planar wicks, at the time the invention was made, it would have been an obvious matter of design choice to a person having ordinary skill in the art to provide a wick plate on the ceiling portion having a plurality of planar wicks, because the Applicant has not disclosed that providing a wick plate on the ceiling portion having a plurality of planar wicks provides a particular advantage, is used for a particular purpose, or solves a stated problem. One having ordinary skill in the art, furthermore, would have expected Hara et al.'s system, and Applicant's invention to perform equally well with either the ceiling wick as taught by Hara et al. and the claimed wick plate on the ceiling portion having a plurality of planar wicks because both wick configurations would perform the same function of transporting fluid via capillary action.

Therefore, it would have been a prima facie case of obviousness to modify Hara et al. to obtain the invention as specified in claim 15 because such a modification would have been

considered a mere design choice which fails to patentably distinguish over the prior art of Hara et al.

Regarding claim 16, Hara et al. further teach the limitation of the wick on the ceiling portion and the wick on the internal side portions of the heat pipe has a linear shape [as illustrated in figure 4, wick 38 is linear in shape].

Regarding claim 18, Hisai et al. as modified by Hoang and Hara et al. teach all the limitations of the claimed invention, but fail to teach the limitation of wick plates being disposed on the ceiling and the internal side portions of the heat pipe.

Hara et al. disclose the limitation of the heat pipe having a wick installed on the ceiling portion, and a wick installed on the internal side portions of the heat pipe (illustrated in figure 4 that the interior of the wafer chuck 31 corresponds to the wafer chuck 91 and has interior sides). Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the heat pipe of Hisai et al. as modified by Hoang to include a wick disposed on the interior portions of the heat pipe as taught by Hara et al. in order for fluid to reach the entire interior surface of the heat pipe, thus increasing cooling efficiency.

Although Hara et al. are deficient in providing a wick plate on the ceiling portion having a plurality of planar wicks, at the time the invention was made, it would have been an obvious matter of design choice to a person having ordinary skill in the art to provide a wick plate on the ceiling portion having a plurality of planar wicks, because the Applicant has not disclosed that providing a wick plate on the ceiling portion having a plurality of planar wicks provides a

particular advantage, is used for a particular purpose, or solves a stated problem. One having ordinary skill in the art, furthermore, would have expected Hara et al.'s system, and Applicant's invention to perform equally well with either the ceiling wick as taught by Hara et al. and the claimed wick plate on the ceiling portion having a plurality of planar wicks because both wick configurations would perform the same function of transporting fluid via capillary action.

Therefore, it would have been a prima facie case of obviousness to modify Hara et al. to obtain the invention as specified in claim 18 because such a modification would have been considered a mere design choice which fails to patentably distinguish over the prior art of Hara et al.

Regarding claim 21, Hisai et al. disclose the limitation of the coolant being water (see paragraph 93, lines 20-26).

Regarding claim 22, Hisai et al. teaches that the thermostatic element extends along the bottom surface of the heat pipe inside the heat pipe [illustrated in figure 3, pipe 21 is disposed along the bottom of the heat pipe], the bottom surface facing away from the heater [see the rejection of claim 1] and the thermostatic element being substantially submerged in coolant when coolant is supplied to the heat pipe [see paragraph 56, the steam being generated will submerge the thermostatic element].

Regarding claim 23, Hisai et al. as modified by Hoang teach all the limitations of the claimed invention, but fail to explicitly teach that the heater extends along the entire top surface of the heat pipe.

The general concept of extending the heater to extend along the entire surface of the pipe falls within the realm of common knowledge as obvious mechanical expedient, and one having ordinary skill in the art would have been motivated to include the use of extending the heater to extend along the entire surface of the pipe in order to increase heat transfer between the heater and the heat pipe, thus increasing system efficiency.

5. Claims 2, 10, 11 and 25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hisai et al. as modified by Hoang as applied to claim 1 above, and further in view of Leffert (US 3,621,906).

Regarding claims 2, 10, 11 and 25, Hisai et al. as modified by Hoang teach all the limitations of the claimed invention, but fail to teach the limitations of providing a coolant flowing element for flowing the coolant into the heat pipe when the plate is cooled, wherein the coolant flowing element is a heater disposed inside and adjacent to the coolant storage tank for flowing the coolant into the heat pipe when the plate is cooled, and wherein the coolant flowing element is adapted to control fluid flow by varying pressure.

Leffert teaches the concept of providing a resistance heater with a control reservoir for increasing the vapor pressure in the heat pipe [see column 11, line 72 – column 12, line 9].

In regard to claims 2, 10 and 25, it would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the system of Hisai et al. as modified by Hoang to include the heater being disposed adjacent to the coolant storage tank as taught by Leffert in order to closely maintain the rate of heat transport from a heat source to the evaporator portion of the heat pipe at a level where the temperature under steady state conditions, thus maintaining a temperature less than that of the heat source.

In regard to claim 11, Although Leffert is deficient in providing the heater inside the coolant storage tank, at the time the invention was made, it would have been an obvious matter of design choice to a person having ordinary skill in the art to provide the heater inside the coolant storage tank, because the Applicant has not disclosed that providing the heater inside the coolant storage tank provides a particular advantage, is used for a particular purpose, or solves a stated problem. One having ordinary skill in the art, furthermore, would have expected Leffert's system, and Applicant's invention to perform equally well with either the heater disposed on the exterior the coolant storage tank as taught by Leffert or the claimed heater inside the coolant storage tank because both heater/coolant storage tank combinations would perform the same function of providing heating of the coolant storage tank.

Therefore, it would have been a prima facie case of obviousness to modify Leffert to obtain the invention as specified in claim 11 because such a modification would have been considered a mere design choice which fails to patentably distinguish over the prior art of Leffert.

6. Claim 27 is rejected under 35 U.S.C. 103(a) as being unpatentable over Hisai et al. as modified by Hoang as applied to claim 3 above, and further in view of Komino (JP5315293).

Regarding claim 27, Hisai et al. as modified by Hoang teach all the limitations of the claimed invention, but fail to teach that at least a portion of the coolant is liquid coolant and the cooling water supply line is substantially submerged in the liquid coolant portion when the coolant is supplied to the heat pipe.

Komino teaches the concept of providing a cooling system for a wafer (referring to figure 3), wherein a wafer (W) is disposed on a platform (20) that is in thermal communication with a heat pipe (40) that is submerged in a tank (46) filled with a coolant (44), wherein a coolant supply line (64) is submerged in the coolant (illustrated in figure 3).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the baking system of Hisai et al. as modified by Hoang to dispose a coolant supply line in a tank full of coolant that is heat exchanged with a heat pipe as taught by Komino in order to provide increase in heat transfer between the heat pipe and the coolant to exhaust heat from the wafer, thus increasing cooling efficiency.

Response to Arguments

7. Applicant's arguments filed 7/15/2010 have been fully considered but they are not persuasive.

I. On pages 8-9, the applicant presents the following argument pertaining to the rejection of claim 1 regarding the limitation "wherein the coolant is supplied into the heat pipe via a path and the coolant storage tank receives the coolant supplied to the heat pipe via the path

used in supplying the coolant into the heat pipe, the path being between the coolant storage tank and the heat pipe":

(a) Hoang discloses a liquid/vapor line between an evaporator heat pipe and a reservoir. Hoang, FIG. 1. The liquid/vapor line has a first portion (liquid line) that is used in supplying a liquid coolant to a heat pipe 100 and a second portion (vapor line) that is used in returning vapor to a reservoir. The first portion is different from the second portion and is not a bidirectional path. Specifically, Hoang fails to disclose, at least, "the coolant storage tank receives the coolant supplied to the heat pipe via the path used in supplying the coolant into the heat pipe" as recited by claim 1.

The Examiner respectfully disagrees. While the examiner agrees that the first and second portions of the liquid vapor line as pointed out by the applicant do not make up a bidirectional path, the claim does not call for a bidirectional path. The liquid/vapor loop of Hoang is shown to allow fluid to flow from reservoir 110 to the evaporator heat pipe. Therefore, the limitation "wherein the coolant is supplied into the heat pipe via a path and the coolant storage tank receives the coolant supplied to the heat pipe via the path used in supplying the coolant into the heat pipe, the path being between the coolant storage tank and the heat pipe" does not limit the claim to a bidirectional pipe.

II. On pages 9-11 of the applicant's remarks, the applicant presents the following arguments pertaining to the rejection of claim 1 regarding the allegation of Hoang teaching away from Hisai:

(a) Hisai discloses a completely different cooling method from Hoang, and the teachings of Hisai and Hoang are not combinable. Hisai is directed to indirect cooling and disparages direct cooling. Hoang is directed to direct cooling.

(b) Hisai does not disclose an element to maintain a constant temperature of the steam in the inner space 12.

(c) The cooling pipe 21 and the CPU 32 of Hisai do not maintain the temperature of the steam at a constant value.

(d) In Hoang, the temperature of the cooling medium is controlled to transport heat from a controlled device (cooling pipe to controlled device), while in Hisai, the temperature of a mounting plate is controlled and the mounting plate is cooled by a working liquid 16 in an inner space 12 that is itself cooled by the heat pipe (cooling pipe to steam (inner space 12) to mounting plate). Accordingly, the apparatus of Hoang is not combinable with the apparatus of Hisai.

(e) Further, Hisai teaches away from a direct heat transfer system. Hisai discloses that preventing direct heat transfer makes it possible to rapidly perform a cooling process while keeping an even temperature distribution. Hisai, Abstract. Hisai disparages a prior art direct cooling method in paragraph [0078] (lines 10-20).

(f) Therefore, Applicants respectfully submit that the disclosures of Hisai and Hoang are not combinable, and Hisai teaches away from using direct heat transfer as disclosed by Hoang.

The Examiner respectfully disagrees with the aforementioned arguments.

In response to arguments (a) - (c), in paragraph 71 of Hisai, the supply of refrigerant from cooling pipe 21 to the mounting face 11a is increased until the set temperature is achieved. When the set temperature is achieved, the refrigerant would be maintained at a constant

temperature in order to maintain the set temperature. Therefore, the CPU in combination with the cooling pipe would be capable of maintaining a constant temperature of the steam.

In response to arguments (a) & (d), referring to figure 1 and paragraph 22 of Hoang, evaporator capillary pump 100 receives a working fluid from reservoir 110 via the liquid/vapor line. A portion of the liquid portion of the vapor line extends into the evaporator capillary pump. When heat is absorbed by the evaporator capillary pump, the working fluid changes from a liquid to a vapor, thus cooling takes place when the phase of the working fluid changes. In figure 3 of Hisai, cooling fluid from tank 25 is injected into pipe 22 inside of heat pipe 11 in order to cool the heat pipe, then the fluid in pipe 22 is drained. The heat pipes of both Hoang and Hisai aim to absorb heat from a heat source. Also, While Hisai uses fluid to cool the interior of the heat pipe and then drains the fluid, the teaching of Hoang of recycling the fluid will prevent waste of the fluid. Therefore, the teachings of Hisai and Hoang are combinable.

In response to arguments (a) & (e), although Hisai and Hoang differ due to the uses of indirect cooling and direct cooling respectively, Hoang allows for fluid to be returned to the heat pipe for the benefit of preventing the wasting of fluid. While Hisai uses fluid to cool the interior of the heat pipe and then drains the fluid, the teaching of Hoang of recycling the fluid will prevent waste of the fluid. Therefore, the teachings of Hisai and Hoang are combinable and do not teach away from each other.

In response to argument (f), in view of the examiner's response to arguments (a) – (e), for at least those reasons, the examiner respectfully submits that the teachings of Hisai and Hoang are combinable and do not teach away from each other.

III. On pages 12-13 of the applicant's remarks, the applicant provides the following arguments directed to the rejections of the remaining dependant claims:

(a) Claims 6, 12-16, 18 and 24 stand rejected under 35 U.S.C. 103(a) as allegedly being unpatentable over Hisai et al. as modified by Hoang as applied to claims 1, 6 and 7 and further in view of Hara et al. (U.S. Patent No. 5,413,167, hereinafter "Hara"). Applicants respectfully traverse this rejection in that even assuming arguendo that Hoang and/or Hara could be combined with Hisai (which Applicants do not admit), the combination of references fails to render even claim 1 obvious because Hoang and Hara suffer from at least the same deficiencies as Hisai with respect to claim 1. Therefore, even in combination, Hisai in view of Hoang and Hara fails to render claims 6, 12-16, 18 and 24 obvious because claims 6, 12-16, 18 and 24 depend from claim 1. Withdrawal of these rejections is requested.

(b) Claims 2, 10, 11 and 25 stand rejected under 35 U.S.C. 103(a) as allegedly being unpatentable over Hisai et al. as modified by Hoang as applied to claim 1 above, and further in view of Leffert (U.S. Patent No. 3,621,906, hereinafter "Leffert"). Applicants respectfully traverse this rejection in that even assuming arguendo that Hoang and/or Leffert could be combined with Hisai (which Applicants do not admit), the combination of references fails to render even claim 1 obvious because Hoang and Leffert suffer from at least the same deficiencies as Hisai with respect to claim 1. Therefore, even in combination, Hisai in view of Hoang and Leffert fails to render claims 2, 16, 11 and 25 obvious because claims 2, 10, 11 and 25 depend from claim 1. Withdrawal of these rejections is requested.

(c) Claim 27 stands rejected under 35 U.S.C. 103(a) as allegedly being unpatentable over Hisai et al. as modified by Hoang as applied to claim 3 above, and further in view of Komino (JP 5315293, hereinafter "Komino"). Applicants respectfully traverse this rejection in that even assuming arguendo that Hoang and/or Komino could be combined with Hisai (which Applicants do not admit), the combination of references fails to render even claim 1 obvious because Hoang and Komino suffer from at least the same deficiencies as Hisai with respect to claim 1. Therefore, even in combination, Hisai in view of Hoang and Komino fails to render claim 27 obvious because claim 27 depends from claim 1. Withdrawal of this rejection is requested.

In response to arguments (a) – (c), in view of the Examiner's response to the arguments in sections I & II above, the rejections to the remaining dependant claims are properly upheld.

Therefore, for at least the reasons stated above, the examiner respectfully submits that the rejections of the pending claims are properly upheld.

Conclusion

8. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event,

however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to AZIM RAHIM whose telephone number is (571) 270-1998. The examiner can normally be reached on Monday - Thursday 7am - 3pm EST and Friday 7am - 9:30am EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Frantz Jules can be reached on 571-272-6681. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/A. R./
Examiner, Art Unit 3784
7/17/2011

/Frantz F. Jules/

Supervisory Patent Examiner, Art Unit 3784